Job #09-241-P

July 29, 2010

Mr. Michael Hefner
c/o Karn Surveying & Engineering, Inc.
Attention: Mr. Scott Harry
129 West Fig street
Fallbrook, California 92028

UPDATE GEOLOGIC RECONNAISSANCE REPORT, 58 ACRE AQUEDUCT ROAD PARCEL, BONSALL, CALIFORNIA (APN 127-110-81)

I. INTRODUCTION

The above-referenced property consists of rugged hillside terrain with intervening canyons. Slope areas of the region are commonly marked by large outcrops and residual rock boulders that can create a potential rockfall hazard to lower developed sites. We understand that the property is planned for subdivision into 4 parcels for residential purposes with a Remainder Parcel. Large open spaces are planned throughout the property. The property was previously evaluated by this office in regards to geologic hazards which resulted in a report entitled "Geologic Reconnaissance Report, 58 Acre Aqueduct Road Parcel, Bonsall, California (APN 127-110-81)," Job #09-241-P, dated August 5, 2009. The report was reviewed in connection with this effort and is included herein as Appendix A.

Subsequent to the referenced report, a Tentative Parcel Map & Preliminary Grading Plan was prepared by Karn Engineering and Surveying. A copy of the most current plan is included with this transmittal as Plate 1. The purpose of this update is to identify potential rockfall hazards as they relate to the planned building sites as shown on Plate 1 and to comment on the feasibility of the attached Preliminary Grading Plan. A site visit was conducted by our project geologist and field personnel on March 29 and May 26, 2010 as a part of this effort. Opinions presented herein are based upon geologic mapping of the available field outcrops and exposures.

II. SITE DESCRIPTION / PROPOSED DEVELOPMENT

Topographic conditions at the property are shown on the attached Preliminary Grading Plan, Plate 1. The property consists of the south margins of a north-south trending ridge

with hillside areas marked by bold hard rock outcrops and residual corestones.
The property is planned for a 4-Parcel split for residential purposes with the Remainder Parcel presently supporting a single family development. The proposed dwellings for Parcel 1 is sited in the upper reaches respective properies. Building construction will consist of stem-wall foundations with raised wood supported on existing undisturbed ground surfaces. Minor grading for Parcel 1 is largely limited to providing access driveways.

The building pad and planned dwelling for Parcel 2 is located approximately mid-slope adjacent the south side of the proposed interior road. Significant fills, on the order of 25 feet will be needed to create the level building pad as shown on Plate 1. Resulting fill slopes will be on the order of 35 feet high programmed at 2:1 gradients. Vertical cuts to achieve the planned pad elevation are expected to be minor overall (less than 10 feet).

Planned dwellings for Parcels 3 and 4 are located in the lower, southeasterly portion of respective properties. Significant cuts, on the order of 30 feet, will be needed to construct level building pads. Resulting cut slopes are planned for 1½:1 gradients and will approach 50 feet in height. Noise mitigation berm fill slopes are also planned for both building pads. The berm embankment slopes are proposed for 1½:1 gradients and will approach 25 feet (Parcel 3) and 60 feet (Parcel 4) in height. Both berms will include fill over cut slopes.

Construction of an interior roadway, Street B, will include 1½:1 cut slopes approaching 45 feet in height. Roadway fills will include one significant fill slope, at the east margin of the property, that will approach 20 feet high. Slope gradients approaching 1½:1 maximum are being considered for this fill slope. Remaining fill slopes are planned for 2:1 gradients maximum.

III. SEISMIC GROUND MOTION VALUES

For design purposes, site-specific seismic ground motion values, based upon the Preliminary Grading Plan, were determined as part of this investigation in accordance with the California Building Code (CBC). The following parameters are consistent with the indicated project seismic environment and our experience with similar earth deposits in the vicinity of the project site, and may be utilized for project design work:

TABLE 1

Site Class	S_s	S_1	F_a	F_v	S_{MS}	S_{M1}	S_{DS}	S_{D1}
B	1.260	0.487	1.0	1.0	1.260	0.487	0.840	0.325

Site Class	S_S	S_1	F_a	F_v	S_{MS}	S_{M1}	S_{DS}	S_{D1}
According to Chapter 16, Section 1613 of the 2007 California Building Code.								

Explanation:

S_S: Mapped MCE, 5% damped, spectral response acceleration parameter at short periods.

S_1: Mapped MCE, 5% damped, spectral response acceleration parameter at a period of 1-second.

F_a: Site coefficient for mapped spectral response acceleration at short periods.

F_v: Site coefficient for mapped spectral response acceleration at 1-second period.

S_{MS}: The MCE, 5% damped, spectral response acceleration at short periods adjusted for site class effects ($S_{MS}=F_aS_S$).

S_{M1}: The MCE, 5% damped, spectral response acceleration at a period of 1-second adjusted for site class effects ($S_{M1}=F_vS_1$).

S_{DS}: Design, 5% damped, spectral response acceleration parameter at short periods ($S_{DS}=\frac{2}{3}S_{MS}$).

S_{D1}: Design, 5% damped, spectral response acceleration parameter at a period of 1-second ($S_{D1}=\frac{2}{3}S_{M1}$).

Site peak ground accelerations (PGA) based on 2 percent probability of exceedance in 50 years defined as Maximum Considered Earthquake (MCE) with a statistical return period of 2,475 years is also evaluated herein in accordance with the requirements of CBC Section 1613 and ASCE Standard 7-05. Based on our analysis, the site PGA_{MCE} was estimated to be 0.52g using the web-based United States Geological Survey (USGS) ground motion calculator. The design PGA determined as two-thirds of the Maximum Considered Earthquake (MCE) was estimated to be 0.34g.

IV. CONCLUSIONS AND DISCUSSIONS

Based upon the foregoing site reconnaissance and current Preliminary Grading Plan, development of the planned residential subdivision, as shown on Plate 1, with associated roadways and underground improvements at the project property, is feasible from a geologic viewpoint. The property is mostly underlain by competent and stable crystalline bedrock units that are mantled by a cover of surficial soil.

The following geotechnical factors will most likely impact site development and related costs:

1. The most significant geological factor will be moderate to locally high levels of ground shaking at the site during periods of activity along distant active faults. Faulting, seismically induced ground failures or slope stability hazards of natural

terrain are not indicated at the property.

2. Rockfall hazard potential was determined at the property for planned Parcels 2, 3, and 4 (Parcel 1 is situated at the top of a ridge). After a careful and thorough examination of exposed rocks above proposed Parcels 2, 3 and 4, significant rockfall hazards were not identified. Rocks above the referenced parcels were found to be well-seated in the underlying substratum, or are more angular to tabular rocks, and therefore do not pose a significant rolling hazard. Areas evaluated for rockfall hazards are indicated on Plate 1. Pictures showing typical rock exposures are included as Plate 3. Picture locations and orientation are shown on the Partial Site Plan, Plate 2.

   However, one-rounded boulder with a potential for rolling downslope was identified above Parcel 3. Photographic views of the noted rock is shown on Plate 4 (along with the approximate latitude and longitude of the rock). The photo locations and orientations are indicated on Plate 2.

   Hand drilling and placement of expansive elements which will crack the rock into angular pieces is recommended for the one rock hazard identified and shown on Plate 3. It is anticipated that this method will have very little impact on the surrounding biological areas. The drilling is done by a hand-operated drill that can be walked to the subject rock. Minimal impact may result from the fractured rock falling on nearby scrub or grass.

   Based upon the available evidence it is the professional opinion of the undersigned that rockfall hazards are less than significant for house pad locations on Parcels 2 and 4. Additionally, inclusion of the mitigation measure for one-rounded boulder identified as described in this report would reduce the rockfall hazards to a level that is considered less than significant to the house pad on Parcel 3. The term less than significant means that the house pad locations would be considered safe for human occupancy from potential rockfall hazards.

3. Project bedrock are competent units which typically perform well in graded conditions and will adequately support future fills, structures and improvements. Graded cut embankments exposing crystalline bedrock will be grossly stable to proposed design heights at planned 1½:1 gradients maximum.

   Large berm shaped embankment fills are planned for noise mitigation on Parcels 3 and 4. The berms are proposed for 1½:1 gradients maximum with the berm on Parcel 4 approaching 55 feet in height. Also, a 1½:1 fill slope is being considered for the support of an eastern portion of the proposed Street B. The noise reduction fill embankment berms and Street B fill slope, as currently shown on Plate 1, are

considered feasible from a geologic viewpoint. Detailed construction recommendations, which may include stability enhancement with reinforcing geogrids and higher levels (above 90%) compaction, can be provided by the project Geotechnical Consultant in the forthcoming geotechnical report.

Large graded slopes, more than 40 feet in height, should be provided with adequate terraces for control of surface drainage and debris per applicable codes and as recommended by the Project Geotechnical Consultant.

4. Existing surficial soils mantling the project bedrock are loose to soft deposits not suitable for structural support and should be regraded in the planned new fills, building and improvement areas.-

5. Uniform and stable bearing soil conditions should be constructed beneath the planned buildings and improvements. This can best be achieved by supporting site structures on competent native or cut ground as approved by the project geotechnical consultant or conventional removal and recompaction of the existing upper soil mantle. Actual remedial grading procedures and minimum removal depths for constructing sage and stable building surfaces and fill embankments at the property should be established based on excavation of exploratory test pits, soil sampling, and engineering analyses at the time of the site geotechnical study.

6. Project bedrock are hard units which can cause excavation difficulties in deeper cuts and during foundation/utility trench excavations. Specific rock excavation characteristics should be evaluated in a site geotechnical study based upon actual test trench exposures, in conjunction with grading permit(s).

Should any questions arise concerning this report, please do not hesitate to contact this office. Reference to our **Job #09-241-P** will help to expedite our response to your inquiries.

We appreciate this opportunity to be of service to you.

VINJE & MIDDLETON ENGINEERING, INC.

Steven J. Melzer
CEG #2362

Distribution: Addressee (2)

SM:hh

COUNTY OF SAN DIEGO TRACT 21159

SHEET 1 OF 1 SHEETS

TENTATIVE PARCEL MAP & PRELIMINARY GRADING PLAN

SCOTT HARRY RCE 63792

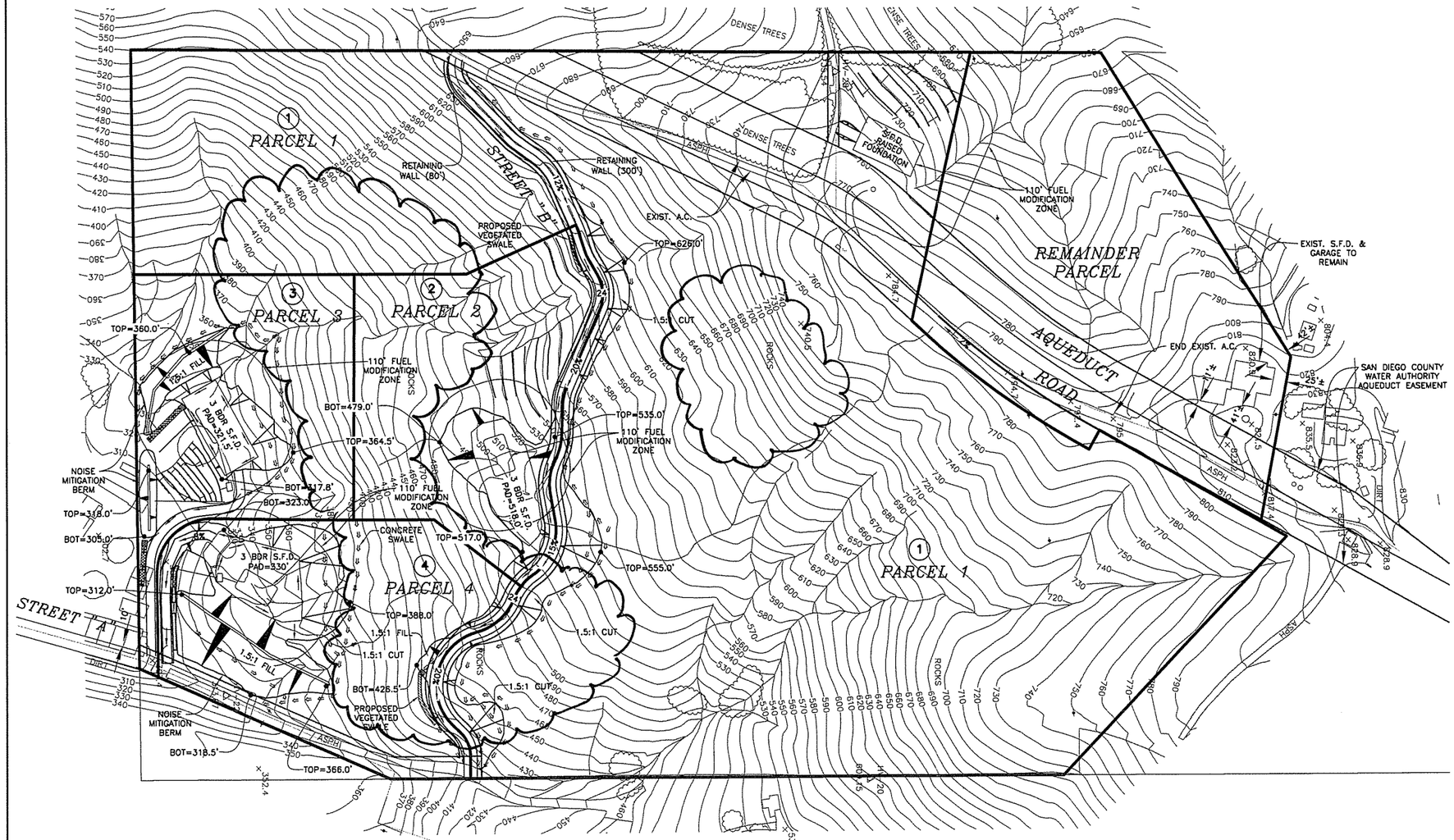
PREPARED BY:
KARN ENGINEERING & SURVEYING
129 WEST FIC ST.
FALLBROOK, CA 92028
760-728-1134

"THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY."

N

SCALE: 1" = 100'

0' 50' 100' 200' 300' 240'

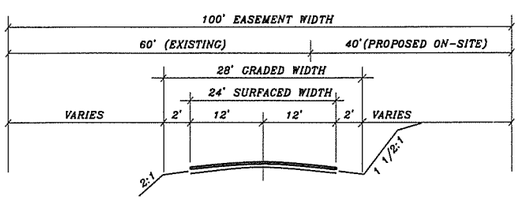


LEGEND

		YARDAGE QUANTITIES	
		YARDAGE CUT 2:1/1.5:1 RATIO	YARDAGE FILL 2:1 RATIO
	REMAINDER PARCEL	EXISTING SINGLE FAMILY DWELLING (NO GRADING PROPOSED)	
	8.1 +/- AC GROSS 5.6 +/- AC NET		
(1)	**PARCEL 1**		
	35.7 +/- AC GROSS 31.6 +/- AC NET	30 C.Y. CUT TOP EL=755.0	30 C.Y. FILL TOE EL=749.0
(2)	**PARCEL 2**		
	4.7 +/- AC GROSS 4.3 +/- AC NET	1,700 C.Y. CUT TOP EL=784.5	6,200 C.Y. FILL TOE EL=767.0
(3)	**PARCEL 3**		
	4.3 +/- AC GROSS 4.3 +/- AC NET	3,700 C.Y. CUT TOP EL=364.5	4,500 C.Y. FILL TOE EL=317.8
(4)	**PARCEL 4**		
	5.2 +/- AC GROSS 4.4 +/- AC NET	16,900 C.Y. CUT TOP EL=388.0	16,900 C.Y. FILL TOE EL=318.5
	STREET "B"	22,800 C.Y. CUT TOP EL=626.0	1,200 C.Y. FILL TOE EL=406.5.0

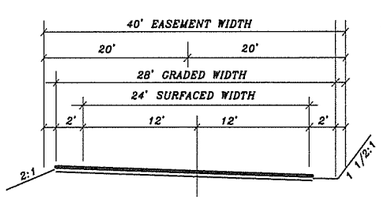
LEGEND

ITEM	S.D.R.S.D./B.M.P.*	SYMBOL
EXIST. CONTOUR		650
FILL SLOPE – 1.5:1/2:1	SS-7*	
CUT SLOPE – 1.5:1/2:1	SS-7*	
PROP. SPOT ELEVATION		650
DRAINAGE FLOW DIRECTION		
PROP. ROCK RIP RAP (10'X10'X1.0') #2 BACKING OVER 1/4" GRAVEL FILTER BLANKET(0.5' THICK). TYPE 2, V=7-8 FT./SEC.	D-40/SS-10*	
BIO FILTER		
RETAINING WALL		
EXISTING RMWD WATER SERVICE		W
PROPOSED SEPTIC LEACH FIELD AREA		
AREAS EVALUATED FOR ROCKFALL HAZARDS		



TYPICAL SECTION

PRIVATE ACCESS EASEMENT
AQUEDUCT ROAD
NO SCALE



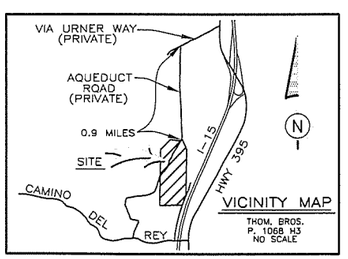
TYPICAL SECTION

40' PRIVATE ACCESS EASEMENT
STREET "A"(ON-SITE) & STREET "B"
NO SCALE

EXISTING ZONING

APN 127-110-81

USE REGULATIONS	A-70
NEIGHBORHOOD REGS	L
DENSITY	0.25
LOT SIZE	4.0 AC.
BUILDING TYPE	C
MAX FIR AREA	–
FIR AREA RATIO	–
HEIGHT	G
COVERAGE	–
SETBACK	W
OPEN SPACE	–
SPECIAL AREA REGS	–



VICINITY MAP
THOM. BROS. P. 1068 H3
NO SCALE

OWNER/SUBDIVIDER

MICHAEL S. HEFNER
31460 AQUEDUCT ROAD
BONSALL, CA 92003
PHONE (760) 218-9171

MICHAEL S. HEFNER _____ DATE

PLOT PLAN AS SHOWN BY ENGINEER IS IN SUBSTANTIAL COMPLIANCE WITH COUNTY CODE.

SOLAR ACCESS STATEMENT

"ALL LOTS WITHIN THIS SUBDIVISION HAVE A MINIMUM OF 100 SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING/COMMERCIAL/INDUSTRIAL UNIT ALLOWED BY THIS SUBDIVISION."

KARN 8842 PRELIMINARY GRADING PLAN 9/20/09

PLATE 1
V&M JOB #09-241-P

PARTIAL SITE PLAN

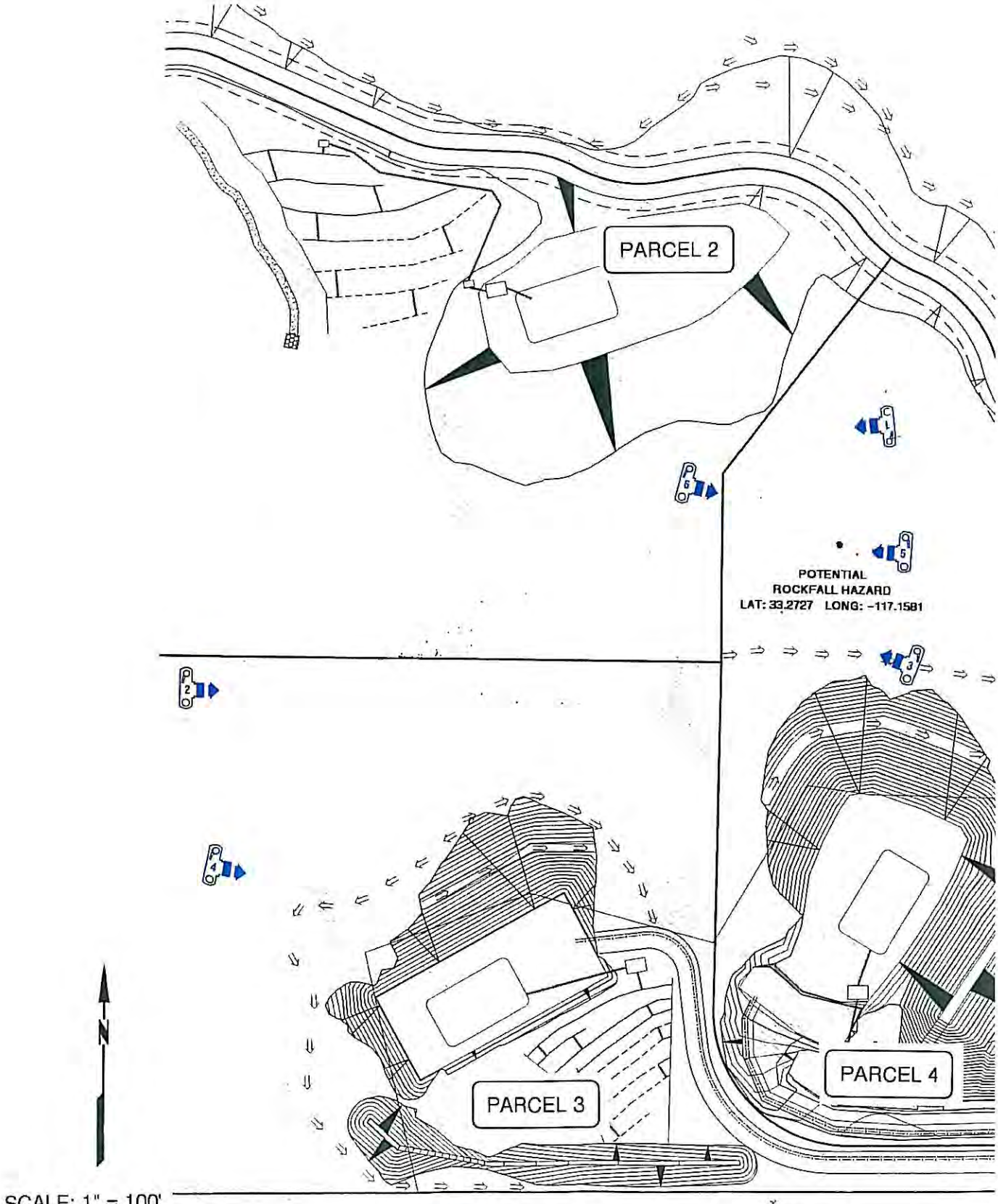


PLATE 2
V&M JOB #09-241-P

TYPICAL ROCK EXPOSURES

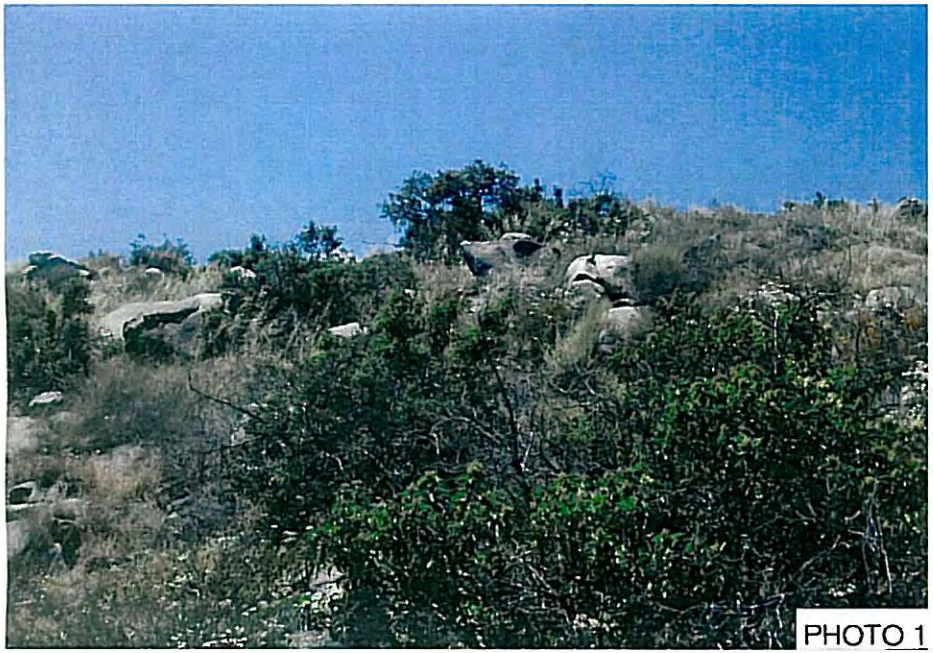


PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 4

PLATE 3
V&M JOB #09-241-P

POTENTIAL ROCKFALL HAZARD

LAT: 33.2727
LONG: -117.1581

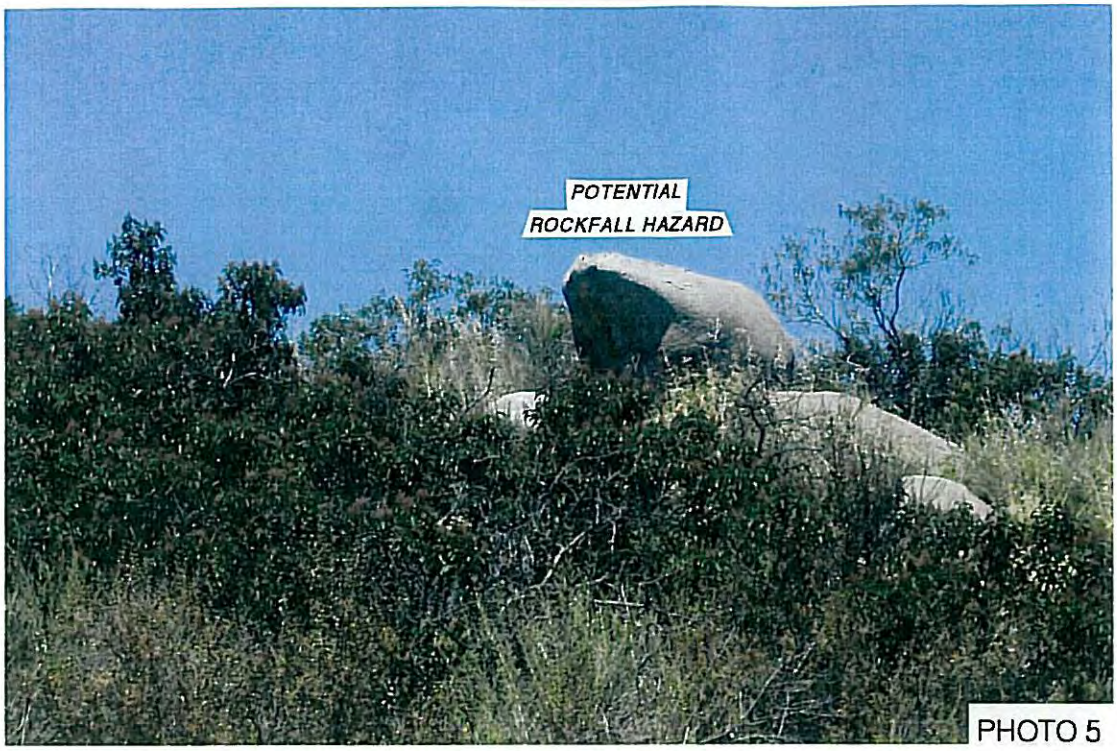


PHOTO 5

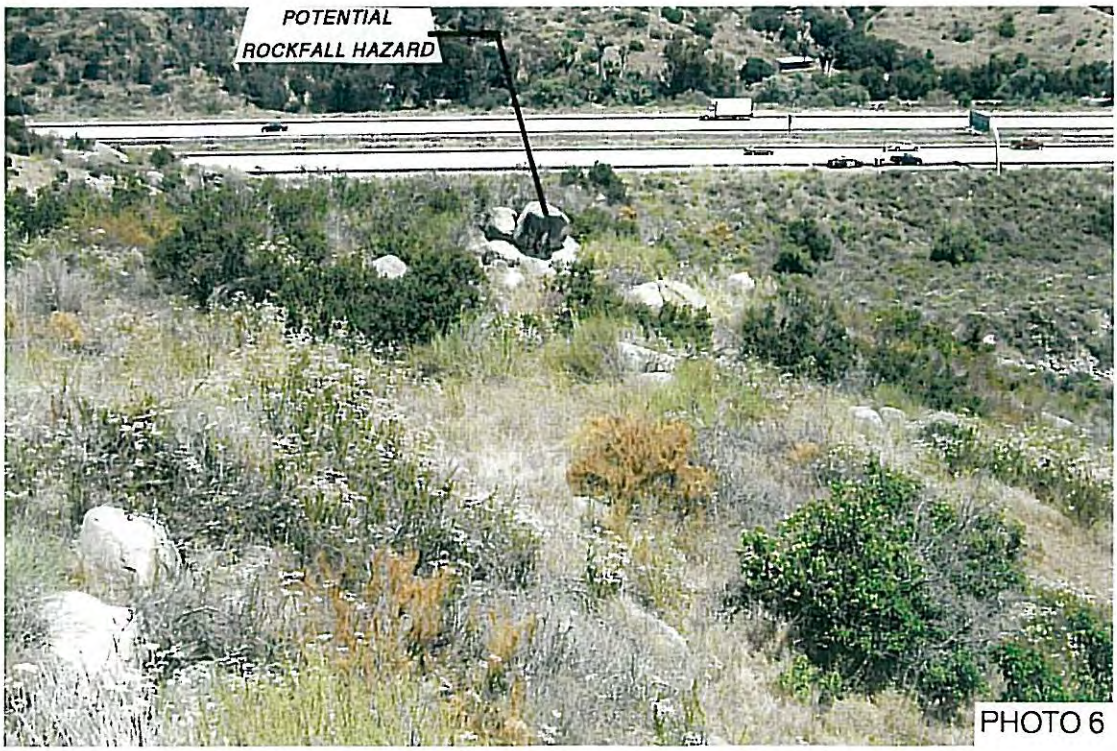


PHOTO 6

PLATE 4
V&M JOB #09-241-P